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EXAMINER DUDNIKOV, VADIM				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/795,879

**Applicant(s)**

CARVER ET AL.

**Examiner**

VADIM DUDNIKOV

**Art Unit**

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10, 13-34, 48-51 and 53-68 is/are pending in the application.
- 4a) Of the above claim(s) 65-68 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 13-34, 48-51 and 53-64 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsman's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Claims 3, 4, 13, and 53 have been amended, and claims 59-68 have been added. Those objections or rejections that have been overcome by amendment are omitted from the present Office Action and are considered withdrawn. Claims 60-68 have been withdrawn as relating to non-elected invention.
2. The Declaration of Charles Pennington under 37 CFR 1.132 filed 1/25/2008 is insufficient to overcome the rejection of claims 1, 3-10, 13-34, 48-51 and 53-65 based upon 35 USC 103 (a) as set forth in the last Office action because said Declaration refer(s) only to the system described in the above referenced application and not to the individual claims of the application. Thus, there is no showing that the objective evidence of nonobviousness is commensurate in scope with the claims. See MPEP § 716.  
  
According MPEP 2131.03 Section II, "Optimization Within Prior Art Conditions or Through Routine Experimentation generally will not support the patentability of subject matter encompassed by the prior art". "The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."

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Applicant's subject matter as claimed have not a patentable difference relative prior arts. Applicant's results of design optimization with using of routine design tools as simulation and similarity modeling could be a subject of a scientific technical publication but not the subject of patents.

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

### ***Response to Arguments***

3. Applicant's argument on page 19+ related to claims 1, 6 and 7 rejection under 35 USC § 103 (a) are not persuasive because prior art "wooden house" discloses that it is well known in manufacturing and in building industry an attaching of rods to different parts with using of matching recessions representing the limitation of claim 1 and flattened surface of cylinder recited in limitation of claim 7 (those methods of cylinders attachment are applicable to parts consisting from different material not excluding very hard and high temperature material, necessary for nuclear fuel industry); "engaging another corner of a second one of the tubes, the attachment means comprising a plurality of **recesses** in respective ones of the corners and a plurality of **rods** that are positioned in the recesses between respective engaged ones of the corners, wherein each of the rods is a cylinder having a single cylindrical wall, the cylindrical wall of each

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of the rods contacting at least two recesses associated with at least two of the tubes". A further improving of the recited limitation with using of modern high technology discussed by Applicant have not a patentable features.

The claim is obvious because known work in one field endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one skilled in the art (MPEP 2143).

According MPEP 2131.03 Section II, "Optimization Within Prior Art Conditions or Through Routine Experimentation generally, will not support the patentability of subject matter encompassed by the prior art". "The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."

Applicant's subject matter as claimed have not a patentable difference relative prior arts. Applicant's results of design optimization with using of routine design tools as simulation and similarity modeling could be a subject of a scientific technical publication but not the subject of patents.

The claim would have been obvious because a person of ordinary skill has good reason to pursue the known options within his her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. Using rods for cells (cylinders) connection is disclosed also by Loftis (Abstract; column 3, lines63+).

Regarding Applicant's argument on page 16 related to "Bosshard teaching away": Bosshard disclose modification of connection between neutron absorber tube different from disclosed by Applicants. However, design with tubes connection "by a pin which is inserted through the lugs welded to the edges of the square tubs" disclosed in admitted art Bosshard specification (column 1, lines 7+) supports obviousness of Applicant's disclose. Accordingly, said Applicants arguments are not persuasive.

Other Arguments are answered in the Rejection of amended claims. Rejection of amended and added claims is established in light of further consideration and search of the prior Art resented below.

### ***Drawings***

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation of claim 7, "the plurality of tubes includes a plurality of flat load bearing surfaces at the corners of respective ones of the tubes, the flat load bearing surfaces on the first one of the tubes engaging the plurality of flat bearing surfaces on the second one of the tubes" must be shown or the features canceled from the claims (see claims 7, 17, 27 and 28).

Regarding said limitation: as can be seen in FIG. 5, connection of rod 8, 12 with rod 20, 22 by pin cannot connect flat bearing surfaces of corners 60 and 62 together as claimed in claims 7, 17, 27 and 28 and as shown in FIG. 9. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. The specification is objected to under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The specification is objected to because the

limitation of claims 7, 17, 27 and 28, "the plurality of tubes includes a plurality of flat load bearing surfaces at the corners of respective ones of the tubes, the flat load bearing surfaces on the first one of the tubes engaging the plurality of flat bearing surfaces on the second one of the tubes" must be disclosed with recitation of drawing's position or the features canceled from the claims (see claims 7, 17, 27 and 28). As can be seen in FIG. 5, connection of rod 8, 12 with rod 20, 22 by pin cannot connect flat bearing surfaces of corners 60 and 62 together as claimed in claims 7, 17, 27 and 28 and as shown in FIG. 9. No new matter should be entered.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 7, 17, 27 and 28-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because with regard to the limitation "a plurality of a flat load bearing surfaces" its metes and bounds of the claimed invention are not defined, rendering the claims indefinite.
9. Claims 48-58 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which



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applicant regards as the invention, because, the metes and bounds of the limitation "at least one said wall of the container" are not defined, rendering the claims indefinite.

10. Claims 48-58 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because, with regard to the limitation "a plurality of couplings" its metes and bounds of the claimed invention are not defined, rendering the claims indefinite.

11. Claims 48-58 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, because, with regard to the limitation "a horizontal bearing load applied to the array of tubes" its metes and bounds of the claimed invention are not defined, rendering the claims indefinite.

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims **1, 6 and 7** are rejected under 35 U.S.C. 103(a) as being obvious over Loftis et al., (U.S. Patent No. 6,009,136, Loftis thereafter, cited before) in view of publication Hoover Fence Co.( Hoover Fence Co. catalog, Newton Falls , OH, June 1999; Hoover hereinafter).

Regarding claim **1**, Loftis discloses a container for storing or transporting spent nuclear fuel (title, abstract, column 1, lines 17+, column 2, lines 38+), the container comprising: a plurality of tubes that receive spent nuclear fuel assemblies, each tube having four sidewalls and four corners defining a rectangular cross section (cells C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+); an attachment means (section [0005], lines 6+) for attaching respective pairs of a plurality of corners of the tubes to each other, at least one corner of a first one of the tubes engaging another corner of a second one of the tubes (rod segments 5 in FIG. 1, 2, column 3, lines 47+, column 4, lines 1+), the attachment means comprising a plurality of recesses (inherently created around of the rod segment 5 by welding as shown in FIG. 1, 2) in respective ones of the corners and plurality of rods that are engaged ones of the corners (rod segments 5 in FIG. 1, 2, column 3, lines 47+, column 4, lines 1+); each engaged corner of the first and second ones of the tubes being formed from an

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intersection of a first sidewall and a second sidewall, the first and second side walls being normal to each other (FIG. 1, column 3, lines 47+, column 4, lines 1+); the first sidewall of the first one of the tubes and the first sidewall of the second one of the tubes being in substantial alignment; and the second sidewall of the first one of the tubes and the second sidewall of the second one of the tubes being in substantial alignment (FIG. 1, column 3, lines 47+, column 4, lines 1+).

Loftis does not necessarily teach the specific means of attaching as disclosed in the Specification, which, under 35 USC 112, sixth paragraph, is interpreted to comprise also pins, nor do the directly teach the limitation: "wherein each of the rods is a cylinder having a single cylindrical wall " and "the cylindrical wall of each of the rods contacting at least two recesses associated with at least two of the tubes".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Hoover drawn to a strong attachment of heavy load parts, hence analogous art because solved similar problem who teaches: cylinders 1 ("rods"), recesses 2 and 3, pin 4 in FIG. 1 on page 3. It is obvious and very common in mechanical art to use such recesses for precise positioning and convenient connection of rods or cylinders to the convex cylindrical surfaces of corners. An attachment means for attaching respective pairs of a plurality of corners of the tubes to each other in this claim is no more than a description of the commonplace hinge, having a barrel comprised by two knuckles, each knuckle extending from a separate leaf, where the leaf consists of the sidewall of one of the adjacent tubes. This type of structural connection is notoriously well known.

Motivation for said modification derives from Loftis: Typically, the tubes (cylinders) are joined at their corners to common rod segments that are located at various positions along adjacent corners of the tubes (column 1, lines 44+).

Claim is obvious because known work in one field endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one skilled in the art (MPEP 2143).

On claim 6, Loftis additionally discloses: the plurality of tubes is arranged in the alternating pattern such that the placement of a four-tube array linked at the corners of the tubes creates a developed cell (cells C2, C4, C6,... in FIG. 1, column 3, lines 47+).

On claim 7, Hoover teaches the flat load bearing surfaces on the first one of the tubes engaging the plurality of flat bearing surfaces on the second one of the tubes ( flat surface of plates 5 in FIG. 1 on page 3 ). A flattening of convex surface improves precision and durability of assembling.

Motivation for said modification derives from Loftis: Typically, the tubes (cylinders) are joined at their corners to common rod segments that are located at various positions along adjacent corners of the tubes (column 1, lines 44+).

Claim is obvious because known work in one field endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one skilled in the art (MPEP 2143).

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15. Claims 8-10, 13-34, 48-51 and 53-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loftis et al., (U.S. Patent No. 6,009,136; Loftis hereinafter, cited before) in view of admitted prior art of Bosshard (U.S. Patent No. 4,630,738, cited before) in view of Lindsay, (U.S. PAP No. 2002/0015614 A1; cited before) in view of publication Hoover Fence Co.( Hoover Fence Co. catalog, Newton Falls , OH, June 1999; Hoover hereinafter).

Regarding claim 8 Loftis discloses: a container for storing or transporting spent nuclear fuel (title, abstract, column 1, lines 17+, column 2, lines 38+), the container comprising: a plurality of tubes ("cells") that receive spent nuclear fuel (cells C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+); a plurality of first rods being mounted at a point where each respective one of the tubes abuts against another one of the tubes (rod segments 5 in FIG. 1, 2, column 3, lines 47+, column 4, lines 1+).

Loftis does not necessarily teach directly the limitation "the rods is a cylinder having a single cylindrical wall, the cylindrical wall of each of the rods contacting the recesses of both the first and second ones of the tubes " and "each of said first rods having an opening, wherein each respective one of the first rods is mounted in a recess of both a first one of the tubes and a second one of the tubes, at least one pin; wherein the openings of respective ones of the first rods mounted on the first one of the tubes are substantially aligned with the openings of respective ones of the first rods mounted on the second one of the tubes; the at least one pin extends through the aligned ones of the openings of the first rods, thereby linking respective ones of the tubes together; and wherein each one of the respective ones of the first rods mate with a corresponding

recess in the second one of the tubes when the openings of the respective ones of the first rods mounted in the recesses in the first one of the tubes are substantially aligned with the openings of the respective ones of the first rods mounted on the second one of the tubes".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of admitted prior art Bosshard drawn to rack for storing nuclear fuel elements, hence analogous art who teach to "It has been known lugs in the form of hinges or pivots have been welded to the edges of square tubes in order to provide lateral support between the tubes. The lugs are connected by a pin which is inserted through the lugs." (Column 1, lines 7+). It is obvious and very common in mechanical art to use such recesses for precise positioning and convenient connection of rods or cylinders to the convex cylindrical surfaces of corners as disclosed by Hoover (as shown in FIG. 1 on page 3).

Further, Lindsay discloses an example of using the tubes being substantial alignment and pins inserted into the tubes (first rods) for connection of different parts of system (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B). Example of similar connection between corners of tubs is represented by Hoover.

Motivation: The hollow rod-pin combination recited in the current claims amounts to no more than a description of the commonplace hinge, having a barrel comprised by two knuckles, each knuckle extending from a separate leaf, where the leaf consists of the sidewall of one of the adjacent tubes. This type of structural connection is notoriously

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well known. Bosshard discloses that it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

Claim is obvious because known work in one field endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one skilled in the art (MPEP 2143).

On claim **9**, Lindsay discloses the at least one pin is captured by one of the first rods (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim **10**, Lindsay discloses the at least one pin comprises a head portion and a body portion, the body portion extending through the openings of the aligned ones of the first rods and the head portion resting against one of the first rods (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and

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reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim **14**, Loftis discloses: each of the tubes has four sidewalls and four corners defining a rectangular cross section, the plurality of recesses being formed at the corners of the tubes (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

On claim **15**, Loftis discloses: the tubes are arranged in an alternating pattern; and the tubes are linked together at the corners, wherein a sidewall of a first one of the tubes is in substantial alignment with a sidewall of a second one of the tubes (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

On claim **16**, Loftis discloses: the tubes are arranged in the alternating pattern such that the placement of a four-tube array linked at the corners of the tubes creates a developed cell (C2, C4, C6,... in FIG. 1 column 2, lines 37+, column 3, lines 48+).

On claim **17**, Hoover teaches: the tubes includes a plurality of flat load bearing surfaces at the corners of the tubes, the plurality of flat load bearing surfaces on a respective one of the tubes engaging the flat bearing surfaces on a remaining one of the tubes (flat surface of plates 5 in FIG. 1 on page 3 ). A flattening of convex surface improves precision and durability of assembling.



Motivation for said modification derives from Loftis: Typically, the tubes (cylinders) are joined at their corners to common rod segments that are located at various positions along adjacent corners of the tubes (column 1, lines 44+).

On claim 18, Loftis discloses: a container for storing spent nuclear fuel (title, abstract, column 1, lines 17+, column 2, lines 38+), the container comprising: a plurality of tubes that receive spent nuclear fuel assemblies (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+), each of the tubes having a plurality of recesses; a plurality of rods being mounted in respective ones of the recesses and each of the rods is a cylinder having a single cylindrical wall, the cylindrical wall of each of the rods contacting both the first and second ones of the recesses (rod segments 5 in FIG. 1, 2, column 3, lines 47+, column 4, lines 1+).

Loftis does not necessarily teach directly the limitation "a plurality of first rods being mounted in respective ones of the recesses; and wherein at least one first rod mounted on a respective one of the tubes is attached to at least one of the first rods mounted on at least one second one of the tubes, thereby linking the respective one of the tubes and the at least one second one of the tubes together, wherein each of the first rods is seated in both a first one of the recesses of the respective one of the tubes and a second one of the recesses of the at least one second one of the tubes".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of admitted prior art

Bosshard drawn to rack for storing nuclear fuel elements, hence analogous art who teach to "It has been known lugs in the form of hinges or pivots have been welded to the edges of square tubes in order to provide lateral support between the tubes. The lugs are connected by a pin which is inserted through the lugs." (Column 1, lines 7+).

Lindsay discloses an example of using the tubes being substantial alignment and pins insertable into the tubes (first rods) for connection of different parts of system (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B). Example of similar connection between corners of tubs is represented by Hoover.

Motivation: The hollow rod-pin combination recited in the current claims amounts to no more than a description of the commonplace hinge, having a barrel comprised by two knuckles, each knuckle extending from a separate leaf, where the leaf consists of the sidewall of one of the adjacent tubes. This type of structural connection is notoriously well known. Bosshard discloses that it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

Claim is obvious because known work in one field endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one skilled in the art (MPEP 2143).

On claim **19**, Lindsay additionally teaches: each of the first rods has an opening and respective pairs of the first rods are attached to each other by axially aligning the openings of the respective pairs of the first rods and extending a pin through the openings of each of the respective pairs of the first rods (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim **20**, Lindsay additionally teaches: the pin comprises a head portion and a body portion, the body portion extending through the openings of each of the respective pairs of the first rods and the head portion abutting against one of the first rods (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim **21**, Lindsay additionally teaches: the pin is captured by one of the first rods (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim **22**, Loftis teaches: each of the tubes has four sidewalls and four corners defining a rectangular cross section (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+). The notoriously well known facts in mechanical art teaches the recesses being formed along at least one of the corners of the tubes and the first rods being mounted in the plurality of recesses along the at least one of the corners of the tubes.

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim **23**, Loftis teaches: the tubes are arranged in an alternating pattern and the tubes are linked together at the corners, wherein a first one of the side walls of the first one of the tubes is substantially aligned with a first one of the side walls of the second one of the tubes, and a second one of the side walls of the first one of the tubes is

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substantially aligned with a second one of the side walls of the second one of the tubes (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

On claim **24**, Loftis teaches: at least one second rod being mounted in the recesses of respective ones of the tubes (rod 5 in FIG. 1, column 3, lines 47+), the at least one second rod mounted in the recess of a respective one of the tubes engaging the recess of a remaining one of tubes when the tubes are linked together (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

On claim **25**, Loftis teaches: the plurality of tubes comprises a first set of tubes and a second set of tubes, wherein the second rods are mounted in each one of the tubes in the second set of tubes (rod 5 in FIG. 1, column 3, lines 47+).

On claim **26**, Loftis teaches: the plurality of tubes is arranged in the alternating pattern such that the placement of a four-tube array linked at the corners of the tubes creates a developed cell (cells C2,C8,C15,... in FIG. 1, column 3, lines 47+).

On claim **27**, Hoover teaches: the tubes includes a plurality of flat load bearing surfaces at the corners of the tubes, the plurality of flat load bearing surfaces on a respective one of the tubes engaging the flat bearing surfaces on a remaining one of the tubes (flat surface of plates 5 in FIG. 1 on page 3 ). A flattening of convex surface improves precision and durability of assembling.

Motivation for said modification derives from Loftis: Typically, the tubes (cylinders) are joined at their corners to common rod segments that are located at various positions along adjacent corners of the tubes (column 1, lines 44+).

On claim **28**, Loftis discloses: a container for storing spent nuclear fuel (title, abstract, column 1, lines 17+, column 2, lines 38+), the container comprising:  
a plurality of tubes that receive spent nuclear fuel rods, each of the tubes having four sidewalls and four corners defining a rectangular cross section (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

Loftis does not necessarily teach the limitation: "each of the tubes having a plurality of recesses along at least one of the corners and a plurality of flat load bearing surfaces along at least one of the corners; a plurality of first rods being mounted in the recesses of the tubes, wherein respective pairs of the first rods are attached to each other, thereby linking the tubes together, and each of the first rods is seated in the recesses of two of the tubes, wherein each of the rods is a cylinder having a single cylindrical wall, the cylindrical wall of each of the rods contacting the recesses of two of the tubes; and wherein the tubes are linked to each other at the corners such that the flat load bearing surfaces on respective pairs of the tubes abut against each other".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Hoover drawn to a strong attachment of heavy load parts, hence analogous art with respect to the problem that needs to be solved (attachment of heavy load parts), in particular: closely related to

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a similar problem of attachment, who teaches: cylinders 1 ("rods"), recesses 2 and 3, pin 4 in FIG. 1 on page 3. It is obvious and very common in mechanical art to use such recesses for precise positioning and convenient connection of rods or cylinders to the convex cylindrical surfaces of corners. The tubes are linked to each other at the corners such that the flat load bearing surfaces on respective pairs of the tubes abut against each other (flat surface of plates 5 in FIG. 1 on page 3 ). A flattening of convex surface improves precision and durability of assembling. This method of linking respective pairs of a plurality of corners of the tubes to each other in this claim is no more than a description of the commonplace hinge, having a barrel comprised by two knuckles, each knuckle extending from a separate leaf, where the leaf consists of the sidewall of one of the adjacent tubes. This type of structural connection is notoriously well known. (See Hoover).

Motivation for said modification derives from Loftis: Typically, the tubes (cylinders) are joined at their corners to common rod segments that are located at various positions along adjacent corners of the tubes (column 1, lines 44+).

The claim is obvious because known work in one field endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one skilled in the art (MPEP 2143). The claim is also obvious because inclusion of the teaching by Hoover on attachment in the invention by Loftis amounts to nothing more than a simple substitution of one known element for another (attachment means) to obtain predictable results (See MPEP 2143).

On claim **29**, Lindsay additionally teaches: the first rods includes an opening, wherein the openings of respective pairs of the first rods of adjacent ones of the tubes are aligned so that a pin may be extended therethrough, thereby attaching the respective pairs of the first rods together (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim **30**, Lindsay additionally teaches: the one or more pins comprise a head portion and a body portion, the body portion extending through the openings of the aligned first rods of adjacent tubes and the head portion being adjacent to one first rod of the plurality of first rods (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).



On claim **31**, Loftis teaches: at least one second rod (rod segment 5 in FIG. 1, column 3, lines 47+) being mounted in the recesses of a respective one of the tubes and engaging the recesses of an adjacent one of the tubes when the tubes are linked together (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

On claim **32**, Loftis teaches: a first set of the tubes and a second set of the tubes (rod segment 5 in FIG. 1, column 3, lines 47+), wherein the second rods are mounted in each one of the first set of tubes (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

On claim **33**, Loftis teaches: the plurality of tubes is arranged in the alternating pattern such that the placement of a four-tube array linked at the corners of the tubes creates a developed cell (cells C2,C8,C15,... in FIG. 1, column 3, lines 47+).

On claim **34**, Lindsay additionally teaches: the pin is captured by one of the first rods (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim 48, Loftis discloses: an apparatus for the storage and transport of spent nuclear fuel (title, abstract, column 1, lines 17+, column 2, lines 38+), comprising: an array of tubes (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+); a container, wherein the array of tubes are disposed in the container and the array of tubes contacts at least one side wall of the container (support bars 1, 7, in FIG. 3, column 4, lines 8+); a plurality of couplings between adjacent pairs of the tubes (Fig. 1, column 3, lines 47+), wherein each of the couplings comprises: a first rod disposed on a first one of the tubes (rod segments 5 in FIG. 1, column 3, lines 47+).

Loftis does not necessarily teach the limitation: "a second rod attached to a second one of the tubes; the first rod being disposed in recesses formed in the outer surfaces of both the first and second ones of the tubes, and the second rod being disposed in the recesses formed in the outer surfaces of both the first and second ones of the tubes, wherein each of the first and second rods is a cylinder having a single cylindrical wall, the cylindrical wall of each of the first and second rods contacting the recesses formed in the outer surfaces of both the first and second ones of the tubes; the first and second rods each having an opening along a length of the first and second rods; and a pin extending through the openings of the first and second rods; and wherein a horizontal bearing load applied to the array of tubes is transferred through the tubes and the couplings to the at least one side wall of the container".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of admitted prior art

Bosshard drawn to rack for storing nuclear fuel elements, hence analogous art who teach to "It has been known lugs in the form of hinges or pivots have been welded to the edges of square tubes in order to provide lateral support between the tubes. The lugs are connected by a pin which is inserted through the lugs." (Column 1, lines 7+).

Lindsay discloses an example of using the tubes being substantial alignment and pins insertable into the tubes (first rods) for connection of different parts of system (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines 1+, pin 70 in FIGs. 7A, 7B). Example of similar connection between corners of tubs is represented by Hoover.

Motivation: A plurality of couplings between adjacent pairs of the tubes recited in the current claims amounts to no more than a description of the commonplace hinge, having a barrel comprised by two knuckles, each knuckle extending from a separate leaf, where the leaf consists of the sidewall of one of the adjacent tubes. This type of structural connection is notoriously well known. Bosshard discloses that it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

Claim is obvious because known work in one field endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one skilled in the art (MPEP 2143).

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On claim **49**, Loftis teaches: each of the tubes further comprises a plurality of side walls, wherein at least one of the side walls of a respective one of the tubes and a side wall of a second one of the tubes are in substantial alignment (cells C2,C8,C15,... in FIG. 1, column 3, lines 47+).

On claim **50**, Loftis teaches: each of the tubes in the adjacent pairs of tubes further comprise at least two side walls joined along a corner, and, a flat bearing surface disposed in at least a portion of the corner, wherein for each of the adjacent pairs of tubes, a first one of the flat bearing surfaces contacts a second one of the flat bearing surfaces (cells C2,C8,C15,... in FIG. 1, column 3, lines 47+).

On claim **51**, Loftis teaches: at least one solid rod disposed between the adjacent pairs of the tubes (rod segment 5 in FIG. M1, 2, column 3 lines 47+).

On claim **54**, Hoover additionally teaches: the recesses (3 in FIG. 1) are formed in a plurality of corners in the outer surfaces of the tubes (on plates 5 in FIG. 1).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim 55, Lindsay additionally teaches: the pin extending through the openings of the first and second rods is rigidly attached to at least one of the first and second rods (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim 56, Lindsay additionally teaches: the pin is rigidly attached to at least one of the first and second rods by a weld, wherein the weld is positioned so as not to be subject to the horizontal bearing load (abstract, tubes 42, pins 44 in FIGs. 2A, 2B, 3A, 3B, 3C, 3D, 4A, 4B, page 2, column 2, lines 38+, page 3, column 1, lines1+, pin 70 in FIGs. 7A, 7B).

Motivation for said inclusion derives from Bosshard: it is considered a simple and reliable solution to connect square tubes with lugs in the form of hinges or pivots that are welded to the edges of those tubes and to pass a pin through the lugs to provide lateral support to the tubes (col. 1, lines 7+).

On claim 57, Loftis additionally teaches: a cross sectional shape of the tubes is selected from the group consisting of a square, a rectangle (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

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(Groups: a circle, a triangle, a hexagon, a heptagon, and an octagon are not elected).

On claim **58**, Loftis teaches: the array of tubes forms a cell, wherein the tubes are arranged in an alternating pattern in the cell (cells C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

Regarding claim **59** Loftis discloses: a dry storage and transport system for the storage and transport of spent nuclear fuel having a plurality of tubes in a container (cells C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+); a plurality of rods (rod segments 5 in FIG. 1, 2), each rod being disposed within, and attached to, a recess formed in an outer surface of a corresponding first one of the tubes (as shown in FIG. 1, 2);

Loftis does not necessarily teach the limitation: "each of the rods has a cylindrical wall that contacts the recess formed in the outer surface of a respective second one of the tubes when the tubes are assembled in the container; a plurality of pins, where respective ones of the rods further comprises a socket to receive one of the pins; and each of the pins being disposed into a pair of the sockets to connect a respective pair of the tubes".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Hoover drawn to a strong attachment of heavy load parts, hence analogous art because solved similar problem who teaches: cylinders 1 ("rods"), recesses 2 and 3, pin 4 in FIG. 1 on page 3.

It is obvious and very common in mechanical art to use such recesses for precise positioning and convenient connection of rods or cylinders to the convex cylindrical surfaces of corners. An attachment means for attaching respective pairs of a plurality of corners of the tubes to each other in this claim is no more than a description of the commonplace hinge, having a barrel comprised by two knuckles, each knuckle extending from a separate leaf, where the leaf consists of the sidewall of one of the adjacent tubes. This type of structural connection is notoriously well known.

Motivation for said modification derives from Loftis: Typically, the tubes (cylinders) are joined at their corners to common rod segments that are located at various positions along adjacent corners of the tubes (column 1, lines 44+).

Claim is obvious because known work in one field endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one skilled in the art (MPEP 2143).

On claim **60**, Loftis teaches: the tubes further comprises a plurality of side walls, wherein a side wall of a first one of the tubes and a side wall of a second one of the tubes are in substantial alignment. (cells C2, C4, C6,... in FIG. 1, column 3, lines 47+).

On claim **61**, Loftis teaches: the recesses are formed in a corner of a respective one of the tubes (recesses around rods 5, as shown in FIG. 1, 2).

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On claim **62**, Loftis teaches: respective ones of the rods are solid (column 1, lines 45+; column 3, lines 64+).

On claim **63**, Loftis teaches: each rod is welded to the corresponding first one of the tubes (column 3, lines 64+).

On claim **64**, Loftis teaches: a cross sectional shape of each of the tubes is selected from the group consisting of a square, a rectangle, (C1-C15 in FIG. 1, 3, column 2, lines 37+, column 3, lines 48+).

(Groups: a circle, a triangle, a hexagon, a heptagon, and an octagon are not elected).

On claim **65**, Loftis teaches: a horizontal bearing load applied to the tubes is transferred through the tubes and the rods to a side wall of the container (inherent for design shown in FIG. 1, 2).

### ***Conclusion***

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vadim Dudnikov whose telephone number is 571- 270-1325. The examiner can normally be reached on 8:00 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's



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supervisor, Jack W. Keith can be reached, Mon-Fri 7:00am-4:00 pm, at telephone number 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VD.

April 13, 2007.

/Johannes P Mondt/  
Primary Examiner, Art Unit 3663